

ABSTRACT OF THE DISCLOSURE

An image sensor with a vertically integrated thin-film photodiode includes a bottom doped layer of a PIN photodiode imbedded in a dielectric layer, wherein a bottom surface of the bottom doped layer completely contacts its corresponding underlying pixel electrode. The bottom doped layers of the PIN photodiodes are formed by a self-aligned and damascene method, therefore the pixel electrodes are not exposed to the I-type amorphous silicon layer of the PIN photodiodes. Moreover, the transparent electrode connects the PIN photodiodes to an external ground voltage power through a ground pad which is a portion of a top metal layer.